Workshop Without Walls: Upstairs Downstairs

Breakout Group 4 Note-taking

Debate #2:
Biosignature measurables - Composition?

Questions:
-Can we measure moment of inertia?
-Can tidally locked planets be habitable?
-How do planets form? Does the Nebular Theory hold up for other solar systems?
-Is our solar system unusual?
-Can we experiment with T and P proposed for super Earths?
-How closely is stellar stoichiometry connected with the planet (internal composition and atmosphere)? How is internal composition related to atmosphere composition?
-How do we build an atmosphere? Outgassing, distance from sun, etc…
-Is the composition of a planet dependent on the number of planets in a system?
-What is viscosity of post-perovskite?
-Can we accurately measure the age of stars?
-How does composition affect thermal history and magnetic field?
-How ubiquitous/homogeneous is Al-26?
-How common are supernova injections into nebulae? How will this affect composition of the star?
-Would accreting a differentiated body release volatiles?
-How would a light element budget in the core affect overall exoplanet composition?
-Did we start with a homogeneous nebula? Compositional variations in the disk?
-How does cloud cover affect surface life (photosynthesis?)?
-Did our solar system start with three habitable planets?
-Can we spot satellites around exoplanets?
-Can Earth sized moons around Jupiter sized planets be habitable?

Measurables/Things to Model:
Instead of focusing on what we can measure, maybe we should focus on what we can model and what we can experiment on.
-Find a correlation between M/R and atmosphere presence.
-High pressure experiments (of variable composition) to determine internal mineralogy/structure of larger planets.
-Model the predicted mineralogy of high P/T conditions
-Model accretion of planetesimals around different stars of varying compositions
-Model how composition changes when you merge objects of different sizes/impact parameters
*currently being modelled

-Model two planets of the same composition and different size - how do the planets differentiate?
-Measure the amount of N in atmosphere? Cloud cover?

Summary:
We need more models!
How do planets accrete? How closely do their compositions match the stellar composition? Why is there so much variation in our own solar system (Venus is very different from Earth)?